REMARKS

Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph as failing to comply withy the written description requirement.

Claims 1-4, 6, 10, and 12 -17 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Hansen et al. US 5,589,256, the '256 patent.

Claims 1, 5-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Hansen et al (US 5,589,256) as applied to Claims 1-4, 12 -17 and further in view of Hansen et al. US 5,789,326, the '326 patent.

The Rejection Under U.S.C. §112, First Paragraph

Claims 1-17 are rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement.

In response, Claim 1 has been amended to indicate that curing occurs at a temperature from about 182 °C to about 215 °C. Claim 1, as now amended, is supported in the specification, line 31, page 9 where curing temperatures of 120 °C to 215°C is cited, and specific examples of curing at 182°C (360 °F) and 193 °C (380 °F) are cited in Table 3, page 16. This temperature range is outside the range cited in the '256 patent. Withdrawal of the rejection is respectively requested.

The Rejection Under U.S.C. § 103 (a)

Claims 1-4, 6, 10, and 12 -17 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Hansen et al. US 5,589,256, the '256 patent.

There is no motivation or suggestion in the Hansen et al. invention to arrive at the instant invention and all elements of the claim are not cited. Hansen et al. teach away from using temperatures greater than 180°C. Furthermore the results of crosslinking of a polycarboxylic acid in the presence of a polyol give unexpected Whiteness Index results.

Claim 1 is an independent claim. Claims 2-4, 6 and 12-17 are dependent claims. Claims 15 and 16 have been canceled.

Hansen et al. teach binding of particles to cellulose fibers through hydrogen bonding and coordinate covalent bonding and achieve the objective of the invention by providing fibers with hydrogen bonding functional sites and applying, to the fibers, a binder. The binder has a functional group that forms a hydrogen bond with the fibers and a functional group that is capable of forming a hydrogen bond or coordinate covalent bond with particles that have a hydrogen bonding or coordinate covalent bonding functionality, column 2, lines 57-64.

Hansen et al. state that their invention can be used with fibers *that have substantial intrafiber covalent crosslinks* or with fibers which are substantially free of intrafiber covalent crosslinking, column 22, line 7-10. Ease of densification is associated with the hydrogen bonds and coordinate covalent bonds formed between the binder and the particle and may be applied to the fibers before, subsequent, or simultaneously with the addition of particles, column 22, lines 30- 39. Hansen et al. state that binding is performed under conditions that favor formation of hydrogen bonds or coordinate covalent bonds and *discourage formation of covalent bonds,* column 22, line 44 - 46. These hydrogen and coordinate covalent bonds can form below 145°C to room temperature, and can bind particles to fibers under neutral to alkaline conditions, column 22, line 64-65. In contrast, conditions that favor covalent bond formation require elevated temperatures above 145°C and acidic conditions, column 22, line 59 - 61.

The '256 patent indicates that high bulk fibers with intrafiber crosslinks (i.e. covalent bonds) can be used in the invention, column 37, line 22-25. These crosslinked fibers are individual fibers each comprised of multiple cellulose molecules where at least a portion of the hydroxyl groups on the cellulose molecule have been *covalently* bonded to hydroxyl groups on neighboring cellulose molecules in the same fiber by crosslinking reactions with crosslinking agents, column 38, line 54 – line 60. The reference teaches however, that in the preparation of these fibers, the curing stage temperatures of 140 °C to about 180 °C are used which is sufficient to effect curing of the crosslinking agent *without scorching* the dry fibers, column 40 line 63-66. The reference teaches that the

dried and cured fibers *are not discolored* from *scorching* and the like, column 41, line 7-10. Thus the reference teaches away from curing at higher curing temperatures.

In view of the teaching of Hansen et al. relative to the adverse effect of high curing temperatures on color, Applicants submit here is no suggestion or motivation to look to the reference to arrive at the instant invention. In fact, the '256 patent teaches away from the 182 °C to about 215 °C curing range used in the instant invention since scorching would result in discolored fibers. Thus a person skilled in the art would be discouraged from curing at temperatures greater than 180 °C in view of the adverse effect of the higher curing temperatures.

Furthermore, Applicants submit that curing the crosslinking agent in the presence of a polyol at 182 °C to about 215 °C gives unexpected synergistic results in the Whiteness Index. The Examiner is requested to again review the Declaration of Angel Stoyanov submitted on August 21, 2007 with the Request for Continued Examination. Pulp has a Whiteness Index of 78.16 (Sample A). When pulp is treated with a catalyst, the Whiteness Index is 77.87 (Sample B). When pulp is treated with a catalyst and sorbitol, the Whiteness Index is 77.37 (Sample H). When pulp is treated with citric acid and a catalyst, the Whiteness Index *decreases to 68.69* (Sample C). However, when pulp is treated with citric acid and a catalyst in the presence of sorbitol, the Whiteness Index *increases to 78.71* (Sample D). Thus whereas citric acid has an adverse effect on the Whiteness Index decreasing it from 77.87 (Sample B) to 68.69 (Sample C), when citric acid crosslinking of the fiber occurs in the presence of sorbitol, the Whiteness Index unexpectedly increases to 78.71 (Sample D) indicating an unexpected synergistic response by the addition of the sorbitol.

Similar results are also realized when crosslinking cellulose fibers with citric acid in the presence of xylitol. When pulp is treated with a catalyst and xylitol, the Whiteness Index is 75.50 (Sample J). When pulp is treated with citric acid and a catalyst, the Whiteness Index *decreases to 68.69* (Sample C). However, when pulp is treated with citric acid and a catalyst in the presence of xylitol, the Whiteness Index *increases to 78.5* (Sample F). Thus whereas citric acid has an adverse effect on the Whiteness Index decreasing it from 77.87 (Sample B) to 68.69 (Sample C), when citric acid crosslinking of the cellulose fiber occurs in the presence of xylitol, the Whiteness Index unexpectedly

increases to 78.50 (Sample F) indicating a synergistic response by the addition of the xylitol.

The '256 patent does not teach each of the elements of the instant invention. As a minimum, the reference does not teach curing of a crosslinking agent in the presence of a polyol at 182 °C to about 215 °C to form individualized intrafiber crosslinked cellulosic fibers and the Whiteness Index greater than about 69.0

Applicants submit there is no motivation or suggestion in the Hansen et al. invention to arrive at the instant invention since, in the curing stage, Hansen et al. only recite curing temperatures from 140 °C to about 180 °C and indicate that this range prevents scorching and discoloration. Hansen et al. do not disclose all elements of the claims such as the curing temperature range cited in the instant invention and the Whiteness Index. Hansen et al. teach away from using curing temperatures greater than 180°C stating that these higher temperatures scorch and discolor the fibers. Furthermore the results of crosslinking of a polycarboxylic acid in the presence of a polyol give unexpected synergistic results in the Whiteness Index. Since Claim 1 is nonobvious under U.S.C. § 103 (a) then any claim depending therefrom is nonobvious. *In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Withdrawal of the rejection is respectfully requested.

Claims 1, 5-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Hansen et al. US 5,589,256, the '256 patent, as applied to Claims 1-4 and 12-17 and further in view of Hansen et al., U.S. 5,789,326, the '326 patent.

The '326 patent discloses the binding of particles to fibers by hydrogen bonding or coordinate covalent bonding. The binders may be selected from the group consisting of glycerin, a glycerin monoester, a glycerin diester, a propylene glycol, a propylene glycol oligomer, a polyglycerin oligomer, urea and combinations thereof, column 3, lines 28. Binders may include binder molecules having a functional group consisting of a hydroxyl, a carboxyl, a carboxylate, a carbonyl, an amide and combinations thereof. Each binder includes at least two such functionalities and the two functionalities are the same or different, column 21, lines 4- 9.

The '326 patent discloses addition of binders to a *wet laid* sheet of cellulose fibers ahead of the drying stage, intermediate the drying stage or after the drying stage,

column 7, line 31 – column 8, line 9. Alternatively, the binders may be added to *air laid* fibers, column 9, lines 51 – 66.

The '326 patent indicates that high bulk fibers may be used in the invention, column 42, lines 23-25. The description of the method for making the high bulk fibers is essentially the same as that in the '256 patent and curing of the fibers is at a temperature of from 140 °C to about 180 °C and set at a level sufficient to effect curing without scorching the dry fibers. The dried and cured fibers are not discolored from scorching, column 45 line 8 -18.

Applicants submit there is no teaching, suggestion or motivation to combine the '326 patent with the '256 patent The '256 patent teaches away from the claimed invention, not every element of the claimed invention is present and curing the crosslinking agent in the presence of a polyol at 182°C to about 215°C results in a synergistic unexpected response in Whiteness Index.

Claim 1 has been amended to indicate that curing occurs at a temperature from about 182°C to about 215°C thus further distinguishing it from the Hansen et al. '256 patent which teaches curing at 140°C – 180°C and indicates that curing above this temperature results in scorching of the fibers and discoloration of the fibers. The arguments set forth for Claims 1-4 and 12 -17 above are incorporated into the response for this rejection.

The '256 patent is silent as to the specific groups of polyols recited in Claim 6 and the specific polyols in Claims 7- 12. The Examiner states that the '326 patent, which also discloses a process for preparing intrafiber crosslinked cellulose fibers that are individualized, crosslinked, dried and and cured as substantially set forth in the '256 patent, specifies that polyols may be selected such as sorbitol.

The reference to sorbitol as a binder must be taken within the context of the claims. Claim 1 of the '326 patent teaches a *wet-laid* fibrous product and Claim 3 and 4 cite one of the binders for the *wet-laid* product is sorbitol. Thus the Examiner has taken the reference to the binder out of context and there is no basis for combining the reference with the '256 patent.

Applicants submit there is no basis for combining the references since there is no teaching suggestion or motivation to do so. One skilled in the art would not look to the

'256 patent which teaches away from curing the crosslinking agent in the presence of the polyol at curing temperatures greater than 180°C and combine it with the '326 patent to arrive at the instant invention. Even though sorbitol is a polyol there would not be an expectation of success with this combination in view of the teaching away of the higher curing temperature range. The '256 patent teaches that in making crosslinked fibers, curing temperatures greater than 180°C lead to scorching and discoloration of the fibers and therefore there is no motivation to go any further and to combine it with the '326 reference to sorbitol as the polyol. Furthermore, Applicants have shown unexpected synergistic results which are reflected in the Whiteness Index when a crosslinking agent is cured in the presence of a polyol in the 182°C -215°C range. Applicants further submit that not all the elements of Claim 1 are present such as the curing temperature at 180°C to 215°C and the Whiteness Index of 69.0. Since Claim 1 is nonobvious under U.S.C. § 103 (a) then any claim depending therefrom is nonobvious. *In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Withdrawal of the rejection is respectfully requested.

CONCLUSION

Based on the foregoing, Applicants submit that the application is in condition for allowance and request it proceed accordingly. If the Examiner has any further questions or comments the Examiner is invited to contact the Applicants' agent.

Respectfully submitted

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